**FEDERAL STATE BUDGET EDUCATIONAL
HIGHER EDUCATION INSTITUTION
"ROSTOV STATE MEDICAL UNIVERSITY"
MINISTRY OF HEALTH OF THE RUSSIAN FEDERATION**

FACULTY OF TREATMENT AND PREVENTION

Appraisal Fund

in the discipline "Chemistry"

Specialty 05/31/01 General Medicine

2023

1. Interim certification form - exam
2. Type of intermediate certification - oral interview.
3. List of competencies formed by the discipline:

Code competencies	Content of competencies (results of mastering OOP)	Contents of elements competencies, in the implementation of which discipline involved
OK-1	ability for abstract thinking, analysis, synthesis.	
OPK-7	readiness To use main physico-chemical, mathematical and other natural science concepts and methods when solving professional problems.	

4.**Stages of developing competencies in the process of masteringeducational programs**

Competence	Disciplines	Semester
OK-1	Anatomy	12
	Histology, embryology	12
	Biochemistry	2, 3,4
	Physiology	3, 4
OPK-7	Biology	1.2

5.**Stages of developing competencies in the process of mastering the discipline**

Sections of the discipline	Codes of formed competencies	
	OK-1	OPK-7
Semester 1		
Section 1	+	
Section 2	+	+
Section 3	+	+

6. Forms of assessment tools in accordance with the competencies being developed

Code competencies	Forms of assessment tools	
	Current/milestone certification	Interim certification
OK-1 OPK-7	Oral survey Colloquium Testing	Interview

7.**Current control**

Example of questions for an oral survey on the topic: " Fundamentals of chemical thermodynamics and kinetics.":

1. Thermodynamic systems: definition, classification of systems (isolated, closed, open) and processes (isothermal, isobaric, isochoric). Standard condition. Basic concepts of thermodynamics: internal energy, work, heat.

2. The first law of thermodynamics. Enthalpy, standard enthalpies: formation, combustion of a substance, reaction. Hess's law. Application of the first law of thermodynamics to biological systems.

3.. Second law of thermodynamics. Entropy. Gibbs energy. Predicting the direction of spontaneous processes.

4. The principle of energy coupling.

5. Dependence of the reaction rate on the concentration of substances. Molecularity, the order of the elementary act of reaction. Kinetic equations of first and zero order reactions.

6.. Dependence of reaction rate on temperature, temperature coefficient of reaction rate and its features for biochemical processes. Activation energy.

7.. Catalysis: homogeneous and heterogeneous. Energy profile of the catalytic reaction.

8. Chemical equilibrium. Reversible and irreversible in the direction of the reaction. Chemical equilibrium constant. Predicting shifts in chemical equilibrium.

9. Classification of solutions according to the degree of dispersion and saturation. Ways to express the concentration of solutions: mass fraction of solute, molar concentration.

10. Colligative properties of solutions: Raoult's law, lowering the freezing point of a solution, increasing the boiling point of a solution.

11. Osmosis, osmotic pressure, Van't Hoff's law. Osmolality and osmolarity of biological fluids. Oncotic pressure.

12. Heterogeneous equilibria. Solubility constant. Conditions for the formation and dissolution of precipitation.

Colloquium – ticket survey(consist of2 theoretical questions and a situational task).

Example of questions - section 1:

1.. Dependence of the reaction rate on the concentration of substances. Molecularity, the order of the elementary act of reaction. Kinetic equations of first and zero order reactions.

2. Dependence of reaction rate on temperature, temperature coefficient of reaction rate and its features for biochemical processes. Activation energy.

3. Catalysis: homogeneous and heterogeneous. Energy profile of the catalytic reaction.

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7. Osmosis, osmotic pressure, Van't Hoff's law. Osmolality and osmolarity of biological fluids. Oncotic pressure.

8. Heterogeneous equilibria. Solubility constant. Conditions for the formation and dissolution of precipitation.

9. Protolytic theory of acids and bases. Protolytic reactions. Concepts about acids and bases.

10. Buffer systems: definition, classification. Calculation of pH of buffer systems. Buffer zone and buffer capacity. Mechanism of action of buffer systems.

11. Blood buffer systems: bicarbonate, phosphate, hemoglobin, protein. Interaction of buffer systems of the human body.

12. The concept of the acid-base state of the body (ABS), types of disorders and methods of its correction.

13. The concept of oxidation-reduction potential (ORP). Redox reactions in the human body.

14. Complex compounds: classification, nomenclature, structure. Ideas about the structure of biocomplex compounds (hemoglobin, cytochromes, cobalamins).

Situational tasks:

No. 1. What is the structure of the silver iodide sol micelle obtained by adding 40 ml of silver nitrate solution (C(AgNO)) to 30 ml of potassium iodide solution (C(KI) = 0.006 mol/l$_3$) = 0.004 mol/l)?

Answer : The sol was obtained by the condensation method using the exchange reaction:

$AgNO_3 + KI \rightarrow AgI \downarrow + KNO_3$

In order for a colloidal solution (sol) to form instead of an AgI precipitate, a condition is necessary: one of the reagents must be in excess.

Let's calculate the number of silver and iodine ions:

$n(Ag^+) = C.V = 40 \cdot 10^{-3}l \cdot 0.004\ mol/l = 1.6 \cdot 10^{-4} mole;$

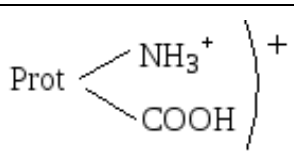
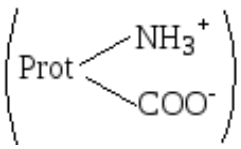
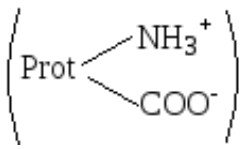
$n(I^-) = C.V = 30 \cdot 10^{-3}l \cdot 0.006\ mol/l = 1.8 \cdot 10^{-4} mole,$

No. 2. To which electrode will the protein move during electrophoresis in a buffer solution containing equal concentrations of hydrogen phosphate and dihydrogen phosphate ions, if at pH = 6.0 the protein remains at the start?

Answer. At pH =pI = 6.0 (isoelectric point) the protein remains at the start, i.e. during electrophoresis it does not move towards the cathode or anode. Therefore, the protein is electrically neutral (b).

At pH<pI, the protein is positively charged, since the dissociation of the carboxyl group (a) is suppressed.

At pH pI, the protein is negatively charged, since the dissociation of the amino group (c) is suppressed.

		
(A)	(b)	(V)
pH<pI	pH = pI = 6.0	pH>pI

The pH of the buffer solution is determined by the Henderson-Hasselbach equation:

$$pH = pK(H_2RO_4) + \log \frac{[HPO_4^{2-}]}{[H_2PO_4^-]},$$

since according to the conditions of the problem $[O_4^{2-}] = [H_2PO_4^-]$, then pH = pK($H_2PO_4^-$) = 7.21 (reference [HP data].

Since the pI for the protein is ≈ 6.0, then pH = 7.21 is greater than the pI, therefore, the protein is negatively charged and will move to the anode during electrophoresis.

No. 3 During electrophoresis, particles of silver chloride sol, obtained by mixing equal volumes of a solution of silver nitrate with a concentration of 0.005 mol/l and sodium chloride, move to the cathode. In what range was the concentration of the sodium chloride solution?

Answer. From the analysis of the electrophoresis results, we can conclude that the micelle granule is positively charged. The formula of a micelle with a positive granule charge is:

{[mAgCl]•nAg+• (nx) NO_3^- }x+•x NO_3^-

To destroy a micelle of this structure, it is necessary that sodium chloride is in short supply. Since the volumes of the mixed solutions are the same, the concentration of NaCl should be less concentration $AgNO_3$, i.e. less than 0.005 mol/l.

C(NaCl) < 0.005 mol/l.

Frontier control

Test control

(10 tasks as an example).

1. Disaccharides consist of monosaccharide residues

1) related peptide bond
2) related ester bond
3) linked by a glycosidic bond
4) during the interaction of which a hydrogen molecule is split off
5) entering into a condensation reaction

The correct answer is 1.3

2. Reducing disaccharides include

1) fructose
2) maltose
3) sucrose
4) glucose
5) lactose

The correct answer is 1.4

3. Disaccharides - condensation products of monosaccharides, are called

1) alkyl glycosides
2) aryl glycosides
3) glycoside-glycoses
4) glycoside-glycosides
5) peptides

The correct answer is 2.4

4. Participate in the formation of glycosidic bonds in disaccharides

1) glycosidic groups of two monosaccharides
2) glycosidic group of only one monosaccharide
3) only primary alcohol groups

4) only secondary alcohol groups
5) primary and secondary alcohol groups
The correct answer is 2.5

5. Carbohydrates do not exhibit restorative properties.

1) cellobiose
2) fructose
3) isomaltose
4) sucrose
5) ribose
The correct answer is 1.3

6. Disaccharide – sucrose

1) is formed from α-glu and β-fru
2) formed from β-glu and α-fru
3) contains glycosidic hydroxyls
4) easily oxidizes
5) undergoes hydrolysis *The correct answer is 2.3*

7. During hydrolysis of sucrose

1) the rotation angle of the plane-polarized beam changes
2) the direction of the angle of rotation of the plane-polarized beam changes
3) glucose and galactose are formed
4) galactose and fructose are formed
5) glucose and fructose are formed *The correct answer is 2.5*

8. Inversion of disaccharide solutions is observed

1) after their hydrolysis
2) when the resulting mixture rotates the plane-polarized beam in the opposite direction
3) when the specific rotation changes over time
4) when heated
5) when cooling
The correct answer is 2.3

9. In oxidation reactions of reducing disaccharides

1) keto group is involved
2) the aldehyde group is oxidized
3) the primary alcohol group is oxidized
4) bionic acids are formed
5) both cycles open *The correct answer is 1.3*

10. Maltose is a disaccharide that

1) upon oxidation forms an acid
2) does not undergo hydrolysis
3) not restored
4) forms esters with acid anhydrides
5) does not interact with ammonia solution of silver oxide
The correct answer is 2.5

8.**Interim certification**

Intermediate certification V form exam provides carrying out examination procedure -*ticket interview*and is assessed as unsatisfactory, satisfactory, good, excellent.
The sum of points based on the results of current and midterm control is taken into account in the individual rating of the teacher. The examination grade represents the student's final rating in the discipline and is assigned based on the average score (current, midterm control and intermediate certification).

Examination card (consists of 2 theoretical questions and 2 situational tasks)

Exam questions:

1. Electronic effects of substituents: inductive and mesomeric. Electron-donating and electron-withdrawing substituents and their influence on the reactivity of compounds.

2. Acids and bases according to Brønsted: definition, classification, examples. General patterns in changes in acidic and basic properties in relation to the electronic effects of substituents. Examples.

3. Alcohols (monohydric, polyhydric, phenols): classification, structure, biological role.

4. Formation of esters of polyhydric alcohols with nitric and phosphoric acids.

5. Amines: classification, chemical properties (basic, interaction with acids, aldehydes, nitrous acid).

6. Amino alcohols (aminoethanol, choline): structure, biological role, formation of phosphates, acetylcholine.

7. Aminophenols (dopamine, norepinephrine, adrenaline and their derivatives): structure, biological role. Acylation of aminophenols, formation of salts.

8. Carboxylic acids: classification, ω-nomenclature, IVLC isomerism (structural and spatial). Reaction centers of carboxylic acids. General patterns in changes in acid properties.

9. Specific properties of carboxylic acids - reactions:

* additions (hydrogenation, hydration, carboxylation),

* eliminations (dehydrogenation, dehydration, decarboxylation, dehydrogenation followed by decarboxylation)

10. Thioesters of carboxylic acids: formation, chemical properties - reactions:

* additions (hydrogenation, hydration, carboxylation, aldol condensation);

* substitutions (acylation, isomerization);

* cleavages (dehydration, dehydrogenation);

* thiolase cleavage;

* hydrolysis.

11. General idea of lipids, their classification.

12. Simple (neutral) lipids - triacylglycerols: composition, nomenclature, synthesis, properties: hydrolysis, addition reactions (hydrogenation, halogenation), biological role.

13. Complex lipids: classification. Phosphatidic acids: structure and hydrolysis. Phospholipids (phosphatidylethanolamines, phosphatidylserines, phosphatidylcholines): composition, hydrolysis and formation reactions.

14. Physico-chemical properties of glycerophospholipids (amphiphilicity and surface activity), biological role. Types of colloidal aggregates formed by phospholipids (micelle, bilayer, vesicle). The concept of surfactants.

15. Compounds of a steroid nature: cholesterol (structure, biological role, formation and hydrolysis of cholesteryl esters), bile acids (structure, participation in the emulsification of fats).

16. Membranes: functions, lipid composition. Characteristics of lipid layers of membranes, the influence of various factors on the “fluidity” of the membrane.

17. Carbohydrates: definition, classification by the number of carbohydrate residues (mono-, oligo, polysaccharides). Monosaccharides: definition, classification according to the nature of the functional group (aldoses, ketoses), the number of carbons in the chain.

18. Stereoisomerism of monosaccharides: D- and L- stereochemical series, open and cyclic forms (furanoses and pyranoses; α- and β-anomers). Cyclo-oxo-tautomerism, mutarotation. Fischer and Haworth formulas.

19. The structure of the most important representatives of pentoses (ribose, xylose, ribulose), hexoses (glucose, galactose, mannose, fructose), deoxysugars (2-deoxyribose), 2-aminosugars (glucosamine, mannosamine, galactosamine).

20. Chemical properties of monosaccharides:

- oxidation to: onic, aroic, uronic acids;

- reduction to alditols (xylitol, sorbitol, mannitol).

- esterification at the alcohol group with the formation of phosphorus esters, their properties.

21. Esters of monosaccharides: structure, preparation, properties of phosphoric acid esters.

22. Disaccharides (maltose, cellobiose, lactose, sucrose, trehalose): classification, structure, formation, chemical properties (hydrolysis, oxidation of reducing sugars).

23. Polysaccharides (homo and heteropolysaccharides): structure, classification, biological role, examples.

24. Homopolysaccharides (starch (amylose and amylopectin), glycogen, dextran, cellulose): structure, types of chemical bonds, hydrolysis, biological role. The concept of the biological role and structure of heteropolysaccharides.

25. Nitrogen bases that are part of the nucleic acids of the pyrimidine series (uracil, thymine, cytosine) and the purine series (adenine, guanine): structure, lactim-lactam tautomerism.

26. Nucleosides: composition, nomenclature, general formula, nature of the bond, examples of formation and hydrolysis reactions.

27. Nucleotides: composition, nomenclature, nature of bonds, examples. Nucleoside cyclomonophosphates (cAMP and cGMP): structure, biological role.

28. Chemical reactions involving mononucleotides: hydrolysis, phosphorylation, interconversion of nucleotides, cyclization.

29. Dinucleotides: FAD, NAD+/NADP+: structure, mechanism of action in dehydrogenation/ hydrogenation reactions.

30. Nucleic acids (NA): definition, classification, composition. Chemical properties: hydrolysis of NA, deamination, dimerization of nitrogenous bases in DNA.

31. Primary structure of nucleic acids: nucleotide composition of RNA and DNA, phosphodiester bond. Hydrolysis of nucleic acids.

32. The concept of the secondary structure of DNA. Complementarity of nucleic bases. Hydrogen bonds in complementary pairs of nucleic bases.

33. Natural amino acids: structure, nomenclature and stereoisomerism.

34. Classification of amino acids by: radical structure, acid-base properties, possibility of synthesis in the body.

35. Amino acids: bipolar structure, isoelectric point. Change in the total charge of AA depending on the pH of the environment.

36. Chemical properties of α-amino acids as heterofunctional compounds: amphotericity, esterification reactions, acylation, formation of imines, intra-complex salts.

37. Qualitative reactions to amino acids (ninhydrin, xanthoprotein, with nitrous acid).

38. Biologically important reactions of amino acids by:

* amino group (elimination, transamination),

* carboxyl group (decarboxylation),

* radical (hydroxylation, oxidation and reduction of thiol groups),

* simultaneously amino and carboxyl groups (condensation).

39. Peptides, proteins: definition, classification. Primary structure of a protein.

40. Types of bonds involved in stabilizing the spatial structure of the protein.

41. Secondary structure of a protein: definition, types, connections involved in its stabilization.

42. Tertiary structure of a protein: definition, types, connections involved in its stabilization, forms (globular, fibrillar).

43. Quaternary structure of a protein: definition, connections involved in its stabilization. Concept of oligomers.

44. Complex proteins: classification (glycoproteins, lipoproteins, nucleoproteins, phosphoproteins), functions.

45. Myoglobin and hemoglobin: structure and functions, features of functioning.

46. Thermodynamic systems: definition, classification of systems (isolated, closed, open) and processes (isothermal, isobaric, isochoric). Standard condition. Basic concepts of thermodynamics: internal energy, work, heat.

47. The first law of thermodynamics. Enthalpy, standard enthalpies: formation, combustion of a substance, reaction. Hess's law. Application of the first law of thermodynamics to biosystems.

48. Second law of thermodynamics. Entropy. Gibbs energy. Predicting the direction of spontaneous processes.

49. The principle of energy coupling.

50. Dependence of the reaction rate on the concentration of substances. Molecularity, the order of the elementary act of reaction. Kinetic equations of first and zero order reactions.

51. Dependence of reaction rate on temperature, temperature coefficient of reaction rate and its features for biochemical processes. Activation energy.

52. Catalysis: homogeneous and heterogeneous. Energy profile of the catalytic reaction.

53. Chemical equilibrium. Reversible and irreversible in the direction of the reaction. Chemical equilibrium constant. Predicting shifts in chemical equilibrium.

54. Classification of solutions according to the degree of dispersion and saturation. Ways to express the concentration of solutions: mass fraction of solute, molar concentration.

55. Colligative properties of solutions: Raoult’s law, lowering the freezing point of a solution, increasing the boiling point of a solution.

56. Osmosis, osmotic pressure, Van't Hoff's law. Osmolality and osmolarity of biological fluids. Oncotic pressure.

57. Heterogeneous equilibria. Solubility constant. Conditions for the formation and dissolution of precipitation.

58. Protolytic theory of acids and bases. Protolytic reactions. Concepts about acids and bases.

59. Buffer systems: definition, classification. Calculation of pH of buffer systems. Buffer zone and buffer capacity. Mechanism of action of buffer systems.

60. Blood buffer systems: bicarbonate, phosphate, hemoglobin, protein. Interaction of buffer systems of the human body.

61. The concept of the acid-base state of the body (ABS), types of disorders and methods of its correction.

62. The concept of oxidation-reduction potential (ORP). Redox reactions in the human body.

63. Complex compounds: classification, nomenclature, structure. Ideas about the structure of biocomplex compounds (hemoglobin, cytochromes, cobalamins).

64. Features of the energy state of phase interfaces. Surface energy and surface tension.

65. Surface-active and surface-inactive substances, their classification. Duclos–Traube rule.

66. Sorption. Specific adsorption. Distribution of substances at the interface.

67. Features of adsorption from solutions. Ionites, their application.

68. Dispersed systems (DS): definition, classification, production.

69. Methods for purifying colloidal solutions: dialysis, electrodialysis, ultrafiltration. Physicochemical principles of artificial kidney functioning.

70. Structure of colloidal particles, mechanism of formation of a double electrical layer of sol particles.

71. Electrokinetic phenomena in dispersed systems: electrophoresis, electroosmosis.

72. Stability of colloidal solutions and factors influencing it. Coagulation of colloidal solutions.

Situational tasks:

1. Calculate the standard enthalpy of chemosynthesis occurring in bacteria

Thiobacillus denitrificans:

6KNO3(solid) + 5S(solid) + 2CaCO3(solid) = 3K2SO4(solid) + 2CaSO4(solid) + 2CO2(gas) + 3N2(gas)

according to the values of standard enthalpies of formation of

substances: K2SO4 CaSO4 CO2 KNO3 CaCO3

, kJ/mol -1438 -1432 -393.5 -493 -1207

Determine what type (exo- or endothermic) this reaction belongs to. **Answer**

Let us write down the expression of the first corollary from Hess's law, taking into account the fact that the standard enthalpies of formation of sulfur and nitrogen are equal to zero:

= (3×K2SO4 + 2×CaSO4 + 2×CO2) -

- (6×KNO3 + 2×CaCO3)

Let's substitute the values of the standard enthalpies of formation of

substances: = 3×(-1438) + 2×(-1432) + 2×(-393.5) - (6×(-493) + 2×(-1207)). We

get:

= -2593 kJ

Since <0, the reaction is exothermic.

2. Calculate the standard Gibbs energy of the hydration reaction of serum albumin at 250C, for which DH0 = -6.08 kJ/mol, DS0 =

- 5.85 J/(mol×K). Assess the contribution of the enthalpy and entropy factors.

Answer

We calculate the standard Gibbs energy of the reaction using the

formula: DG0 = DH0 - T×DS0

Substituting the values, we get:

DG0 = -6.08 kJ/mol - 298 K×(-5.85×10-3) kJ/(mol×K) = =

-4.34 kJ/mol

In this case, the entropy factor prevents the reaction from occurring, and the enthalpy factor favors it. Spontaneous reaction is possible provided that, i.e., at low temperatures.

3. Prepare 250 ml of CuSO4 solution with C(CuSO4) = 0.1 mol/l from CuSO4 5H2O crystalline hydrate.

Given: (CuSO4) = 250 ml = 0.25 l C(CuSO4) = 0.1 mol/l

m(CuSO4 H2O) - ?

Answer

2) find the mass of anhydrous CuSO4 in solution: m(CuSO4) =

C(CuSO4) M(CuSO4) = 0.1 80 0.25 = 2 g; 3) find the mass of

crystalline hydrate containing 2 g of CuSO4: M(CuSO4·H2O) =

160 + 5·18 = 250 g/mol;

4. Without resorting to calculations, indicate which of the solutions at the same temperature are isotonic:

a) C(NaCl) = 0.03 mol/l, a = 1 and C(C6H12O6) = 0.03 mol/l; b)
C(CO(NH2)2) = 0.03 mol/l and C(CaC12) = 0.01 mol/l, = 1.

Answer

For electrolyte solutions:
for non-electrolytes i = l, therefore:
For each pair of solutions RT = const, therefore, it is enough to compare the factor i×C(x) in each pair of solutions.
a) 2×0.3 [1] 0.3 (non-isotonic);
b) 0.3 = 3×0.1 (isotonic).

5. Calculate the pH value of the buffer solution obtained by pouring 20 ml of ammonia water solution with C(NH3·H2O) = 0.02 mol/l and 10 ml of ammonium chloride solution with C(NH4Cl) = 0.01 mol/l. (NH3·H2O) = 1.8·10−5. **Find the pH of the buffer diluted 5 times.**

Answer

In the case of a type II buffer system, the pH of the solution is calculated using equation (4.18): Substituting the appropriate values, we obtain:

.

When diluted, the pH of buffer solutions does not change. Therefore, the pH of a buffer solution diluted 5 times will be 9.86.

1. Description of indicators and criteria for assessing competencies at the stages of their formation, description of assessment scales

	Levels of competency development		
	Threshold	***Sufficient***	***High***
Criteria	Competence formed. Demonstrated threshold, satisfactory sustainable level practical skill	Competence formed. Demonstrated enough level independence, sustainable practical skill	Competence formed. Demonstrated high level independence, high adaptability practical skill

Competency assessment indicators and rating scales

Grade "unsatisfactory" (not accepted) or absence formation competencies	Grade "satisfactorily" (passed) or satisfactory (threshold) level of development competencies	Grade "Fine" (passed) or sufficient level development competencies	Excellent rating (passed) or high level development competencies
failure to student on one's own demonstrate knowledge when solving assignments, lack independence in application of skills. Absence confirmation availability formation competencies indicates negative development results academic discipline	student demonstrates independence in application of knowledge skills and abilities to solve educational tasks in full According to sample given teacher, by tasks, solution of which there were shown teacher, it should be considered that competence formed on satisfactory level.	student demonstrates independent application knowledge, skills and skills at decision tasks, tasks similar samples that confirms Availability formed competencies for higher level. Availability such competencies for sufficient level testifies about sustainable fixed practical skill	student demonstrates ability to full independence in choosing a method solutions non-standard assignments within disciplines with using knowledge, skills and skills, received as in development progress given disciplines and adjacent disciplines should be considered competence formed on high level.

Criteria for evaluating forms of control:

Interviews:

Mark	**Descriptors**		
	strength of knowledge	**ability to explain** **the essence of phenomena,** **processes, do** **conclusions**	**logic and** **subsequence** **answer**
Great	strength of knowledge, knowledge of basic processes of the studied subject area,	high skill explain the essence phenomena, processes, events, do	high logic and subsequence answer

	the answer is different depth and completeness disclosure of the topic; possession terminological apparatus; logic and consistency answer	conclusions and generalizations, give reasoned answers, give examples	
Fine	solid knowledge main processes subject matter being studied area, different depth and completeness disclosure of the topic; possession terminological apparatus; free possession monologue speech, however one is allowed - two inaccuracies in the answer	ability to explain essence, phenomena, processes, events, draw conclusions and generalizations, give reasoned answers, give examples; however one or two inaccuracies in the answer are allowed	logic and subsequence answer
satisfy flax	satisfactory process knowledge subject matter being studied areas, answer, different insufficient depth and completeness of disclosure Topics; knowledge of basic questions theory. Allowed several errors in content of the answer	satisfactory ability to give reasoned answers and provide examples; satisfactorily formed analysis skills phenomena, processes. Allowed several errors in content of the answer	satisfactory logic and subsequence answer
dissatisfy strictly	poor knowledge of the subject area being studied, shallow opening Topics; poor knowledge main issues theories, weak skills analysis of phenomena, processes. Allowed serious mistakes in content of the answer	inability to give reasoned answers	absence logic and sequences answer

Test control grading scale:

percentage of correct answers	Marks
91-100	Great
81-90	Fine

71-80	satisfactorily
Less than 71	unsatisfactory

Situational tasks:

Mark	Descriptors			
	understanding Problems	analysis situations	skills solutions situations	professional thinking
Great	complete implication problems. All requirements, declared task, completed	high benefit analyze situation, draw conclusions	high benefit select method solutions problems faithful solution skills situation	high level professional thoughts
Fine	complete implication problems. All requirements, declared task, completed	benefit analyze situation, draw conclusions	benefit select method solutions problems faithful solution skills situation	residual level professional thoughts. one goes down - there are inaccuracies in reply
satisfy flax	astastic implication problems. majority requirements declared task, completed	please satisfy nyaya benefit analyze situation, draw conclusions	satisfactory new skills solutions situation	residual level professional thoughts. falls more a bunch of inaccuracies in reply
dissatisfy strictly	misunderstanding problems. legs requirements, declared task, not completed. No Tveta. Did not have experiments to solve hello	izkaya benefit analyze situation	insufficient solution skills situation	missing